

DATE: May 9, 2007

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TO: Region Engineers
Region Delivery Engineers
Region Development Engineers
TSC Development Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers
Region Traffic and Safety Engineers
TSC Traffic and Safety Engineers
Region Maintenance Engineers
TSC Maintenance Coordinators and Supervisors

FROM: Larry E. Tibbits
Chief Operations Officer

John C. Friend
Engineer of Delivery

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Subject: Bureau of Highway Instructional Memorandum 2007 - 03
Maintenance Crossover Revised Spacing Requirements and
Removal of Unnecessary Locations

With the increased size and operational requirements of department maintenance vehicles, the minimum spacing of maintenance crossovers has been increased from 1,000 feet to 1,500 feet. This accommodation brings the department into conformance with AASHTO design criteria. Existing crossovers located closer than 1,500 feet should be designed for relocation in conjunction with future programmed reconstruction/rehabilitation projects. Also, a new crossover design which provides paved deceleration tapers and increased radii is now available as an optional design choice. The design was approved at the August 3, 2006, Engineering Operations Committee Meeting.

To reduce unauthorized crossover maneuvers to increase safety, unnecessary crossovers need to be removed whenever possible. Each region is to take an inventory of all existing crossovers on limited access divided highways to assess whether any locations are unnecessary and can be removed, either by maintenance forces or in conjunction with programmed work. This determination will be made after consulting with the local agencies providing emergency response services. An inventory process has been developed for this purpose, and instructions to create the inventory are attached.

When considering the addition, elimination, or relocation of crossovers, the criteria for crossover locations are based on the following:

- A. The crossover location shall be a minimum of 1,500 feet beyond the end of the acceleration lane and 1,500 feet ahead of the beginning of the deceleration lane. Where there are ramps on both sides of the highway, the 1,500 foot requirement shall apply to the ramp which gives the greatest distance from the crossover to the structure. Existing crossovers located closer than the above minimums should be designed for relocation in conjunction with future programmed reconstruction/rehabilitation projects.
- B. Crossovers are to be placed at the ends of maintenance sections. These are to be dual crossovers, spaced 500 feet on each side of the point of jurisdictional change. (See MDOT Road Design Manual, Section 12.09.04, Fig. 4.)
- C. At rest areas, one crossover is to be placed at least one mile in advance of the beginning of the deceleration lane for the entrance ramp into the rest area. The other is to be placed 1,500 feet beyond the end of the acceleration lane of the exit ramp from the rest area. Omit this crossover when there is another downstream crossover within one mile.
- D. Weigh station exit and entrance ramps are to be considered as interchange ramps. Two crossovers are required and located as listed in item A above. Existing crossovers built in conjunction with weigh stations that are no longer in use may be removed. However, please contact the Project Planning Division and confirm the status of the facility before removing this type of crossover.
- E. If adjacent crossovers placed in accordance with items A - D above are more than 10 miles apart, an additional crossover between the two existing crossovers may be considered.

Items A - E above, include general rules for locating crossovers. When assessing a specific location, sight distance, grade, topography, etc., should be taken into consideration. Shifting the crossover's location 200 to 300 feet beyond minimums to take advantage of more favorable topography is encouraged. The Michigan Road Design Manual has been revised to reflect the above criteria.

If you have any questions, please contact Mark Bott, Traffic Operations Manager, at 517-335-2625.

Chief Operations Officer

Engineer of Delivery

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Attachments

Subject Index: Traffic Control

BOH-DEL:T&S:MWB:nw

cc: C & T Division Staff

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MITA

Maintenance Crossover Inventory Collection Handbook

April 25, 2007

**For questions, contact:
Linda Burchell
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Inventory Purpose

The primary purpose of the maintenance crossover inventory is to identify how many existing maintenance crossovers exist on Michigan Department of Transportation's (MDOT) limited access freeway. Through the Global Positioning System (G.P.S.) data collected in the inventory, we can also determine where the maintenance crossovers exist in relation to particular fixed features such as weigh stations, rest areas, ramps, and jurisdiction changes (County Lines, Maintenance Responsibility Areas). These associated fixed features are available through other data sources.

Inventory Limits

This maintenance crossover inventory is intended to for the MDOT limited access freeway network only.

It is also limited to official maintenance crossovers (should be marked with official sign).



The inventory is NOT intended to include the 2-track crossings that likely were 'created' by our law enforcement partners.

Data Dictionary

The following is the data dictionary installed in the data collectors to be used for the collection of the maintenance crossover inventory.

"Official Crossovers", Dictionary, "04-17-07 Revd"

- ❖ "Crossover", point, "04-17-07 Revd", 5, seconds, 1, Code
- ❖ "Route Name", menu, normal, "Route at which crossover is located.", normal, Label1
 - "I-69"
 - "I-75"
 - "I-94"
 - "I-96"
 - "I-194"
 - "I-196"
 - "I-275"
 - "I-296"
 - "I-375"
 - "I-475"
 - "I-496"
 - "I-675"
 - "I-696"
 - "I-BL-69"
 - "I-BL-75"
 - "I-BL-94"
 - "I-BL-96"
 - "I-BL-196"
 - "I-BS-196"
 - "I-BS-375"
 - "US-2"
 - "US-10"
 - "US-12"
 - "US-23"
 - "US-24"
 - "US-31"
 - "US-41"
 - "US-127"
 - "US-131"
 - "US-BR-10"
 - "US-BR-12"
 - "US-BR-23"

- "US-BR-24"
- "US-BR-31"
- "US-BR-127"
- "US-BR-131"
- "M-1"
- "M-3"
- "M-5"
- "M-6"
- "M-8"
- "M-10"
- "M-14"
- "M-20"
- "M-25"
- "M-39"
- "M-47"
- "M-53"
- "M-59"
- "M-60"
- "M-66"
- "M-13"
- "M-15"
- "M-17"
- "M-21"
- "M-24"
- "M-26"
- "M-36"
- "M-37"
- "M-43"
- "M-44"
- "M-45"
- "M-46"
- "M-50"
- "M-54"
- "M-55"
- "M-63"
- "M-72"
- "M-84"
- "M-85"
- "M-93"
- "M-96"
- "M-99"
- "M-102"
- "M-104"
- "M-116"

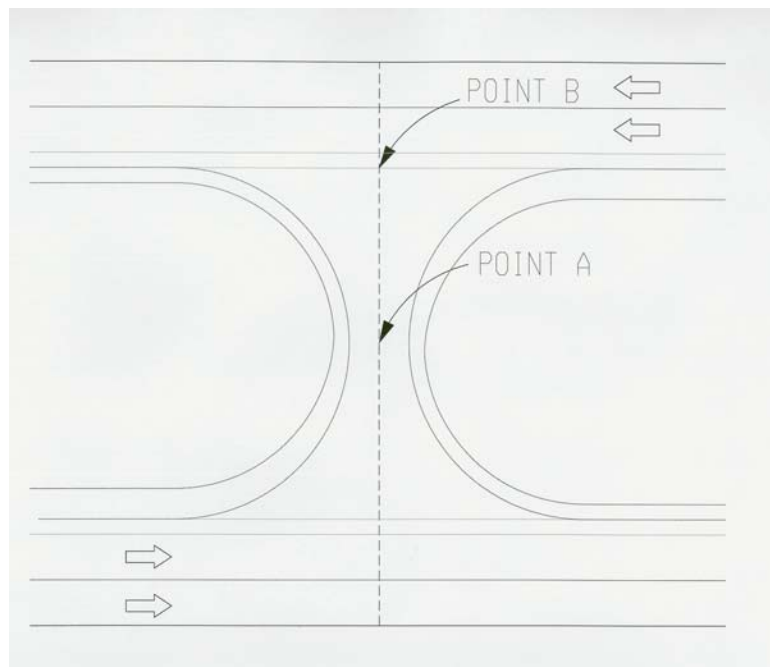
- "M-120"
 - "M-153"
 - "CONN-2"
 - "CONN-4"
 - "CONN-5"
 - "CONN-8"
 - "CONN-9"
 - "CONN-10"
 - "CONN-13"
 - "CONN-14"
 - "CONN-81"
 - "CONN-96"
- ❖ "Type of Crossover", menu, normal, "Refer to figures listed in handbook.", normal, Label2
- "Figure 1"
 - "Figure 2"
 - "Figure 4"
 - "Figure 5"
 - "Other"
- ❖ "Surface", menu, normal, "What type of surface is the crossover?", normal
- "Paved", default
 - "Unpaved"
- ❖ "Condition", menu, normal, "In what condition is the crossover?", normal
- "Good"
 - "Poor"
- ❖ "Date", date, auto, dmy, manual, normal, "Date that coordinates are collected.", normal
- ❖ "Comments", text, 50, normal, "Provide additional remarks.", normal

Further Explanation

Crossover:

This is the field that will include the G.P.S. coordinates for the point location of the maintenance crossover.

To ease in the collection, this point can be taken at any location within the maintenance crossover. In other words, if the person doing the data collection prefers to get off the freeway to collect G.P.S. coordinates near the middle of the crossover (Point A), that is fine. OR, if the person doing the data collection prefers to collect the G.P.S. coordinates at/near where the maintenance crossover intersects the freeway (Point B; shoulder / edge of metal), that is also fine. Either way, a relative line can be made to identify the offset of the maintenance crossover from the aforementioned fixed features.



Route:

Select route name of limited access roadway which has maintenance crossover located within median from provided drop down list in data dictionary.

Type of Crossover:

Figures from MDOT Road Design Manual (12.09.04)

Figure 1 (median is 100' or less, no tapers):

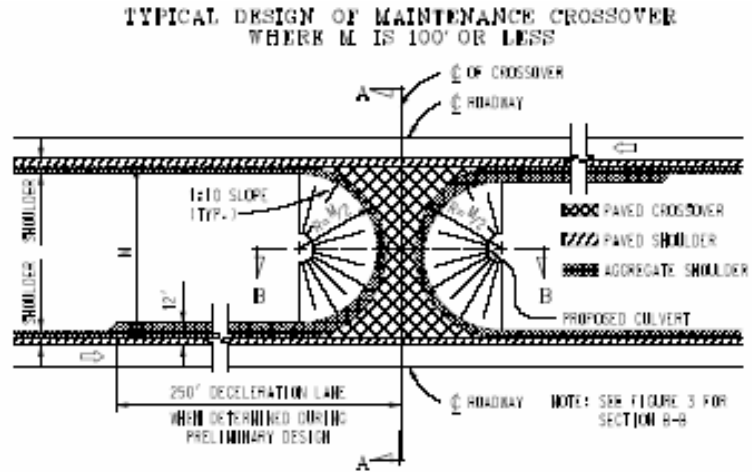


Figure 2 (median is greater than 100', no tapers):

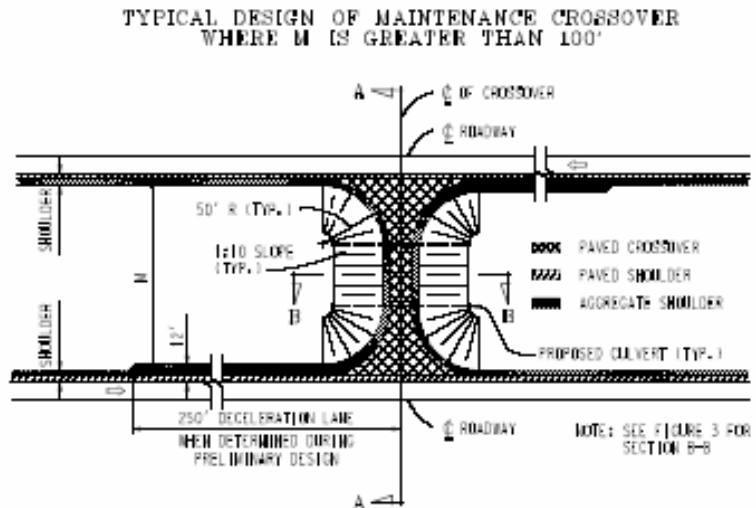


Figure 4 (double crossovers near jurisdiction changes, no tapers):

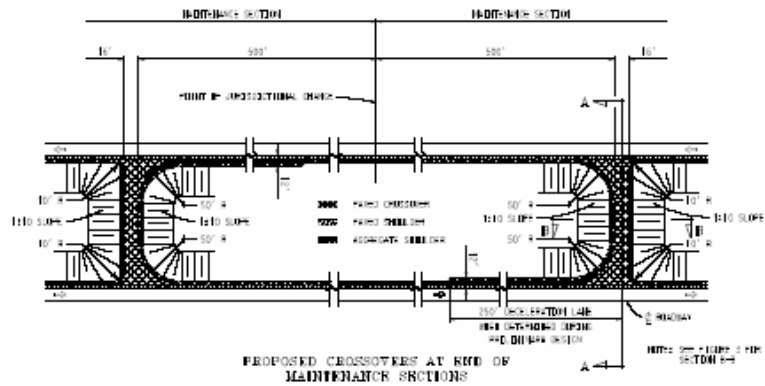
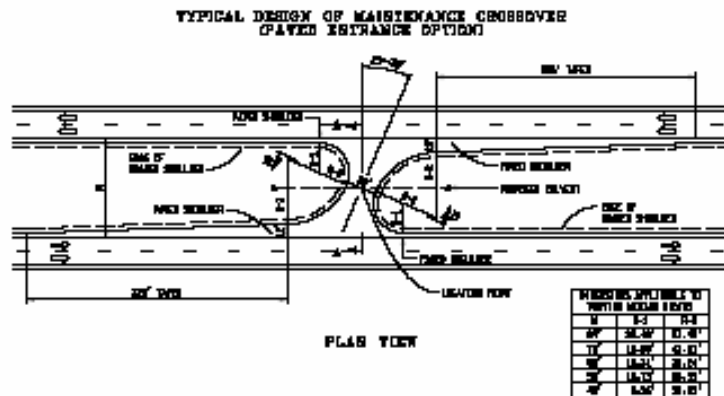


Figure 5 (includes deceleration tapers):



Surface:

Is the surface of the actual maintenance crossover (not necessarily the tapers in/out) paved? If so, select 'paved'. Is the surface gravel, dirt or grass? If so, select 'unpaved'.

Condition:

This response is an opinion (subjective). In your opinion, is the maintenance crossover is 'good' or 'poor' condition?

Date: This field will be auto-populated during the collection process.

Comments: This field gives the person doing the data collection the opportunity to type in any other additional information. It is a 50 character text field.

12.09**CROSSOVERS****12.09.01****References**

Geometric Design Guide VII-670-Series

12.09.02 (revised 12-15-97)**General**

Permanent crossovers are of two types: the emergency and maintenance crossover, commonly associated with limited access roadways and the periodic local traffic crossover that is a necessary adjunct to free access divided roadways. In urban areas, the designer should coordinate crossover locations with the Region/TSC Traffic and Safety Engineer, the local community, and/or the county road agency. The final location of crossovers needs to be coordinated with the Traffic and Safety Division's Geometrics Unit.

12.09.03 (revised 12-15-97)**Free Access Divided Highways**

On the premise that an extra travel distance of up to 1/4 mile is not excessive when crossing a free access divided highway, the following criteria for crossover spacing should apply:

A. Medians Less Than 30' in Width

Crossovers may be constructed, as determined by the Traffic and Safety Division, opposite driveways and side roads or streets.

B. Medians 30' or More in Width

Crossovers may be provided every 1/8 mile (660') in urban areas and every 1/4 mile in rural areas. They may be adjusted 100' either way to conform to existing street or road returns or driveways. No two crossovers should be closer than 500' apart. Public roads should take priority over private drives in the event of a location conflict.

12.09.03B (continued)

Crossovers for through cross streets may be closer than 500' apart.

Additional crossovers may be provided for large developments, e.g., shopping centers, as approved by the Traffic and Safety Division.

If constructed on an existing road, the cost of a new crossover should be borne by the adjacent property owner or developer requesting the crossover, unless the original road construction failed to provide the theoretical 660' spacing.

It is desirable that medians over 30' in width be constructed to physically prohibit random crossing of the median. This can be done with either a ditch or a barrier.

12.09.04 (revised 12-15-97)**Limited Access Divided Highways**

Crossovers on limited access divided highways are for the use of maintenance, police, and emergency vehicles. It is illegal for the public to use them. To discourage such unauthorized use it was Department practice, until May 1985, to simply gravel surface crossovers to make them as unobtrusive as possible. This led to increased maintenance and it became debatable whether it discouraged unauthorized use by a motorist that was determined on making a U-turn.

The Engineering Operations Committee (E.O.C.) has decided that rural maintenance crossovers will be paved.

These crossovers are to have 3" thick HMA surfaces, laid on 8" of Aggregate Base - HMA 1.5' wider on each side than the HMA mat. While an application rate of 330 lbs/syd is usually associated with a 3" thickness, consideration should be given to using the application rate of the top two courses of mainline HMA surfacing, even if the combined rate is 290 lbs/syd and only approximates 3".

Interim Update

VOLUME 3

MICHIGAN DESIGN MANUAL ROAD DESIGN



12.09.04 (continued)

Limited Access Divided Highways

On resurfacing projects, existing crossovers are surfaced at a rate determined during preliminary design.

Thickness of subbase should be as recommended by Region/TSC Soils Engineer, but should not be less than the mainline subbase thickness. The entire crossover embankment may be made from granular material, if the fill is not very long nor very high.

To reduce unauthorized crossover maneuvers, eliminate existing unnecessary crossovers when possible based on the same general rules for locating crossovers. The determination to eliminate existing crossovers should be made after contacting local agencies providing emergency response services. The notification to remove existing crossovers should be in writing with a request to respond within 30 days. Specify that absence of a response to the notification will be considered concurrence with removal of the crossovers.

When considering construction or elimination of crossovers, locations are based on the following:

- A. The crossover location shall be a minimum of 1500' beyond the end of the acceleration lane and 1500' ahead of the beginning of the deceleration lane. Where there are ramps on both sides of the highway, the 1500' requirement shall apply to the ramp which gives the greatest distance from the crossover to the structures.
- B. Crossovers are to be placed at the ends of maintenance sections. These are to be dual crossovers spaced 500' on each side of the point of jurisdictional change. See Figure 4.
- C. At rest areas, one crossover is to be placed at least 1 mile in advance of the beginning of the deceleration lane for the entrance ramp into the rest area. The

12.09.04 (continued)

other is to be placed 1500' beyond the end of the acceleration lane of the exit ramp from the rest area. Omit this crossover when there is another downstream crossover within a mile.

- D. Weigh station exit and entrance ramps are to be considered as interchange ramps. Two crossovers are required and located as in A. preceding. Existing crossovers built in conjunction with weigh stations that are no longer in use may be obsolete. Contact the Project Planning Division to confirm the status of the facility before removing the exiting crossover.
- E. If adjacent crossovers placed as in A to D above are more than 10 miles apart, place an additional crossover between the two.

The above are general rules for locating crossovers. When choosing a specific location, sight distance, grade, topography, etc., must be taken into consideration. It is allowable to shift the location of crossovers 200' to 300' to take advantage of more favorable topography. The Region/TSC Maintenance Engineer should be consulted, during preliminary design relative to exact location of crossovers.

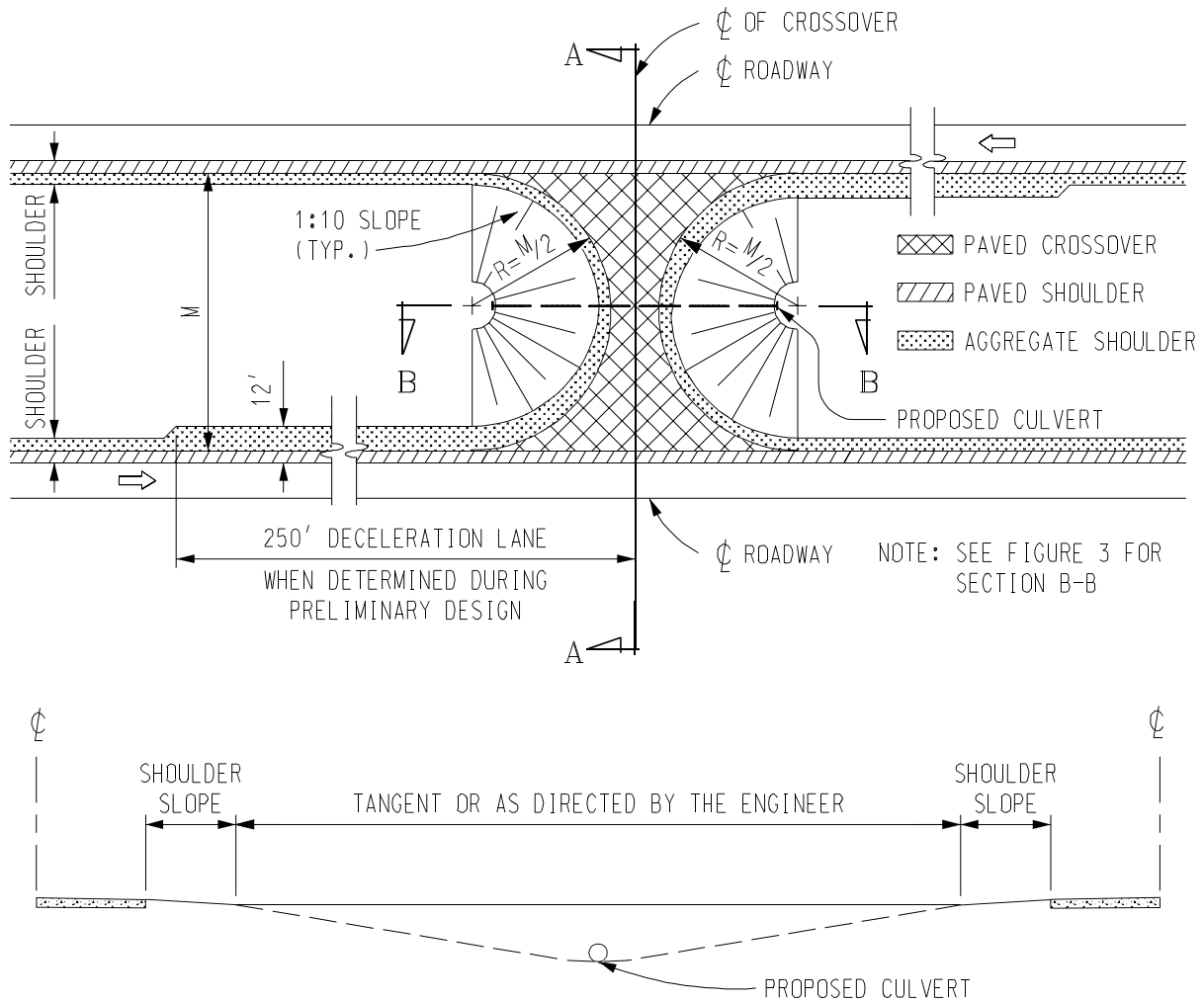
Emergency vehicle crossovers were constructed on some of the earlier Detroit expressways. These consisted of a section of double steel beam guard rail mounted on wheels so as to form a sliding gate. These were normally kept locked, but could be opened by police for access to an accident site by ambulance and fire vehicles. They were rarely used, and provision for crossovers at these locations are to be omitted on future freeway contracts in the City of Detroit. (Most crossovers of this type have already been deleted.)

Examples of rural crossovers are sketched on the following pages.



12.09.04 (continued)

Limited Access Divided Highways

TYPICAL DESIGN OF MAINTENANCE CROSSOVER
WHERE M IS 100' OR LESS

SECTION A-A

Figure 1

12.09.04 (continued)

Limited Access Divided Highways

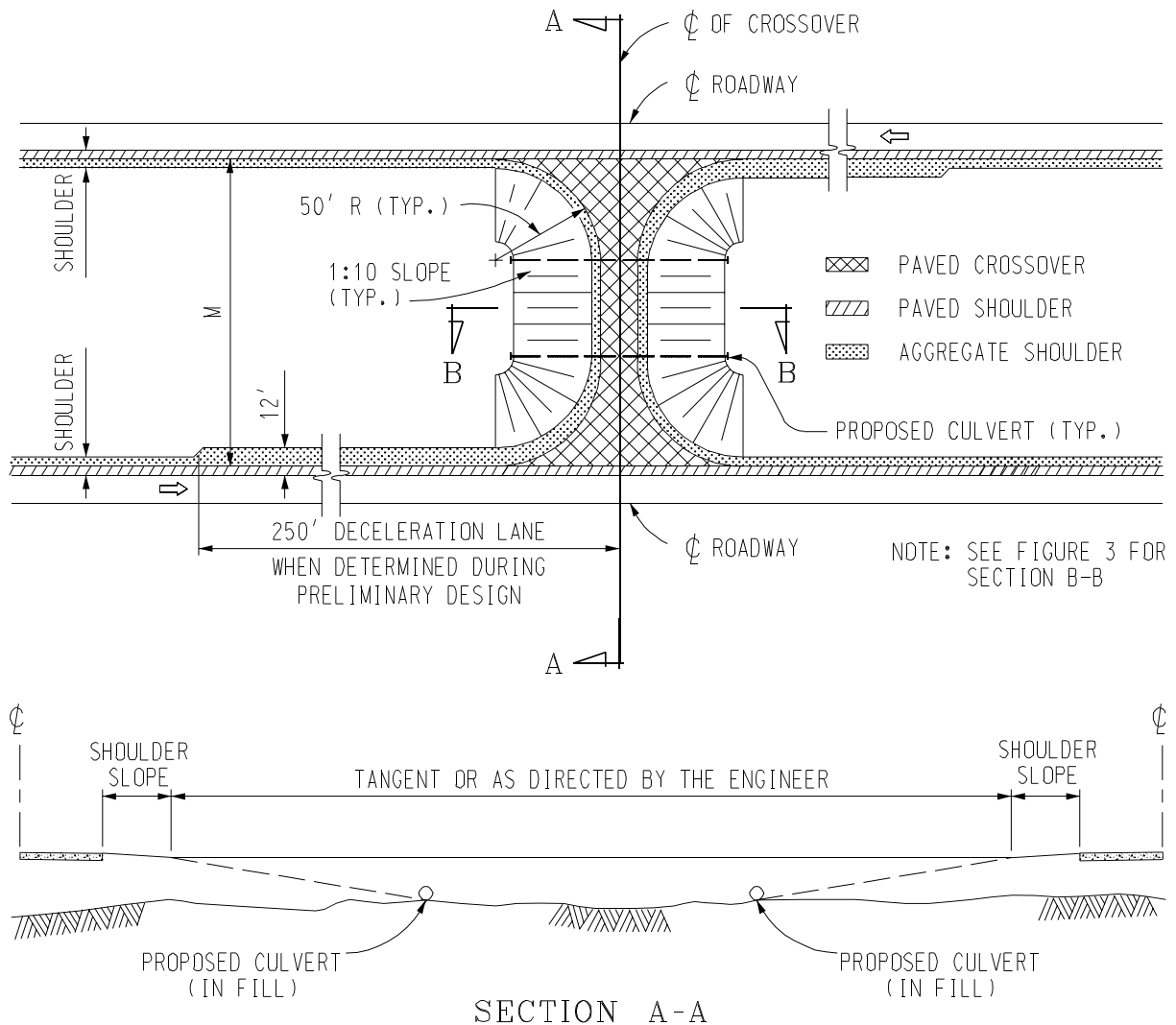
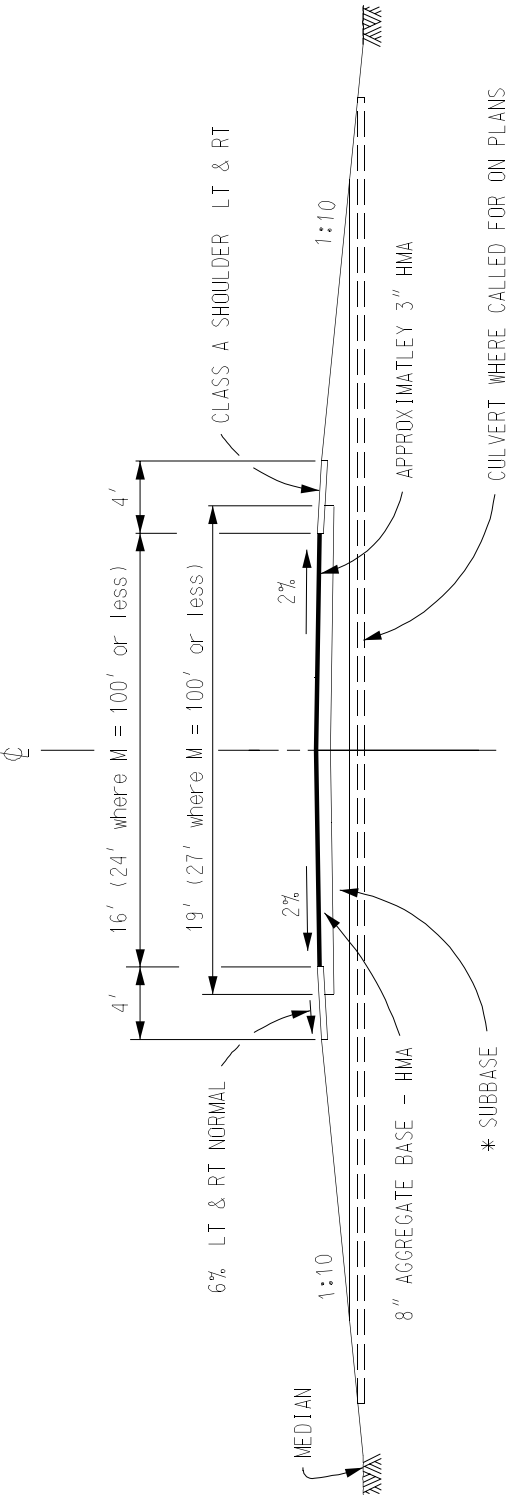
TYPICAL DESIGN OF MAINTENANCE CROSSOVER
WHERE M IS GREATER THAN 100'

Figure 2

12.09.04 (continued)

Limited Access Divided Highways

TYPICAL CROSS-SECTION
FOR EMERGENCY CROSSOVER



SECTION B-B

Figure 3

12.09.04 (continued)

Limited Access Divided Highways

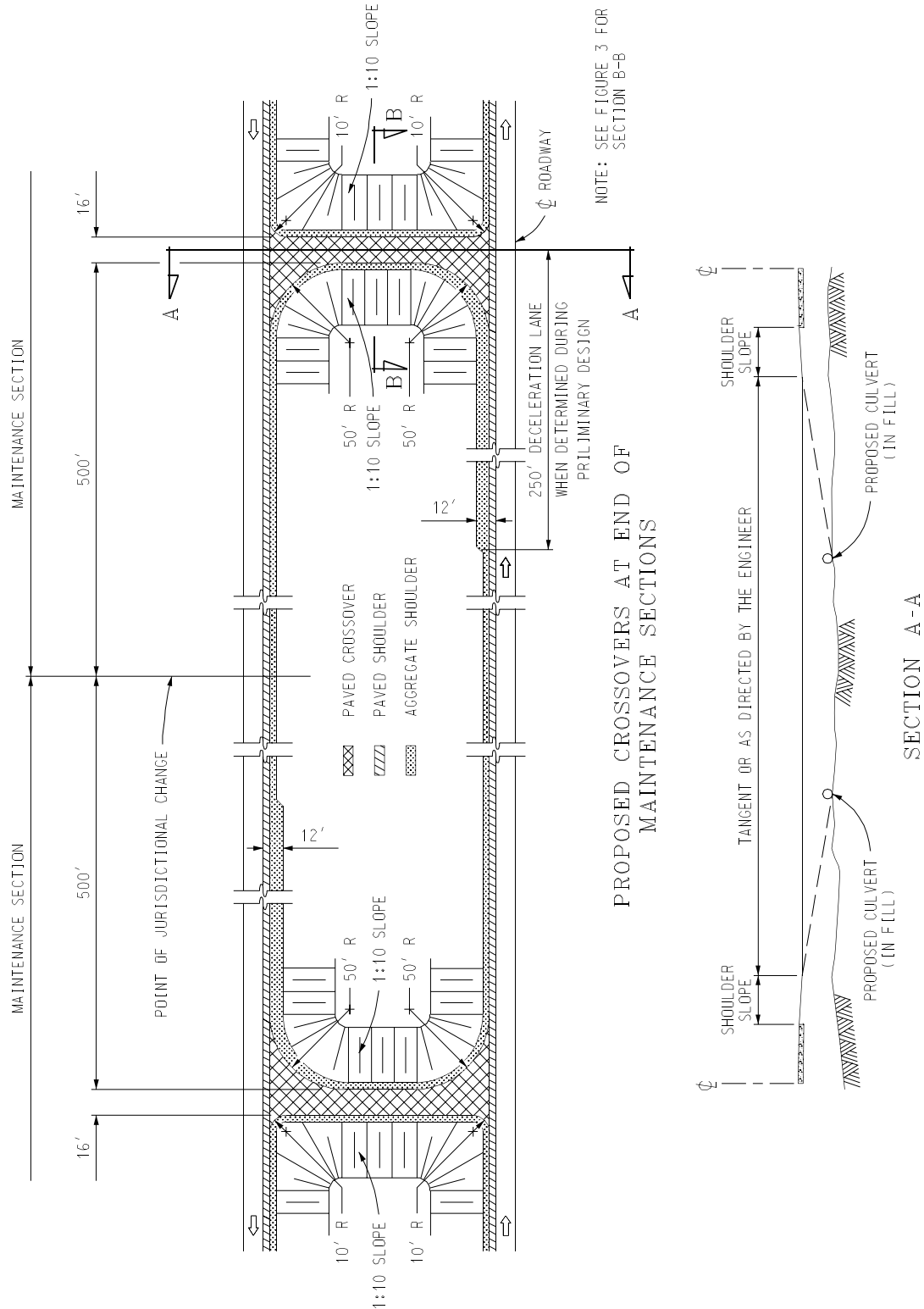


Figure 4

Interim Update

VOLUME 3

MICHIGAN DESIGN MANUAL ROAD DESIGN



12.09.04 (continued)

Limited Access Divided Highways

TYPICAL DESIGN OF MAINTENANCE CROSSOVER (PAVED ENTRANCE OPTION)

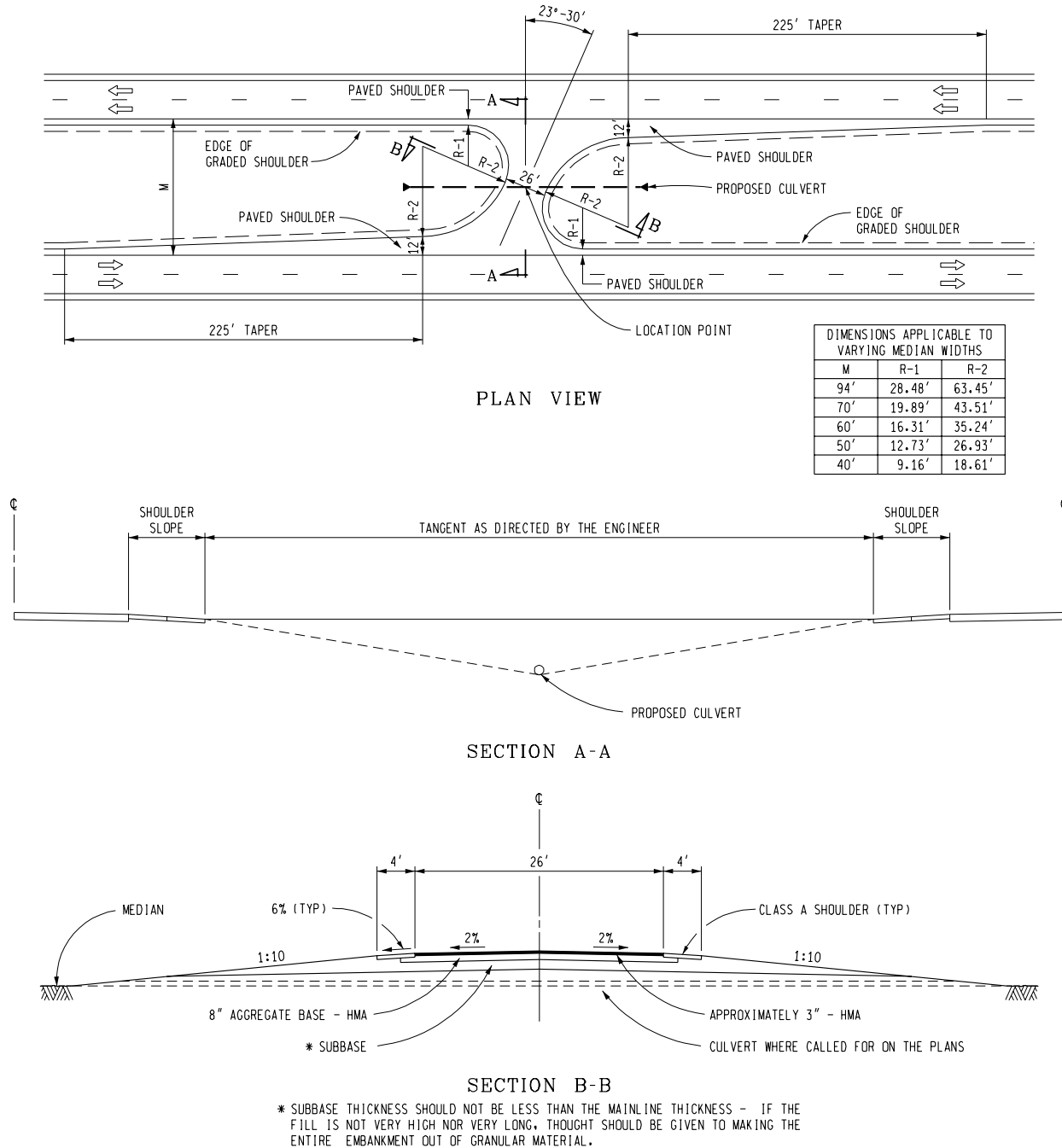


Figure 5

